SCIENCE AND INDUSTRY

reading Decline" Of Citrus Continued

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6 — No. 12

MBER, 1954

Insect Control For
cember, 1954

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reading Decline
Of Citrus

Range Of The
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Florida

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LIVE CITRUS TREES AT WORLD'S GREATEST CITRUS EXPOSITION . . . .

Real, live citrus trees, in full bearing, will be used to point up the "Florida's Golden Treasure" theme of the 1955 Florida Citrus Exposition to be held in Winter Haven, Jan. 15-22, Jack M. Berry, president of the citrus industry show said in making the announcement.

Experienced citrus men have been asked to hunt for trees with full-green foliage, plenty of growing fruit and generally of a "photogenic" nature for removal to the Exposition display area. The trees will be surrounded by samples of all the byproducts, such as canned and concentrate juices, sections, and salads, cattle feed made from the peel, essential oils used as perfume and essence bases and all the other items that have been developed in recent years.

"The addition of real, live trees to our exhibit should attract a lot of attention," Berry said. "There are thousands of winter visitors who come to the citrus producing belt but never take the time to get a good look at producing citrus trees, and our exhibit will be designed to whet their interest in many products."

A "preview" of some of the exhibits to be used by the Exposition to carry out the "Florida's Golden Treasure" theme indicates that many new ideas are being used to emphasize the value of citrus in the daily diet of the nation.

XUM

SUPERIOR

Fertilizer & Chemical Company has purchased the

GROWERS FERTILIZER COMPANY, FORT PIERCE

Superior is now operating a complete fertilizer and insecticide business from its newly acquired plant in Fort Pierce.

Regarding this new plant, Mr. G. D. Sloan, General Manager of Superior, announces that "Superior will make every effort to maintain its 22 years of operation. In addition Superior's east coast customers will be served from this plant. Because of our ability to give much more efficient service and deliveries, we hope to substantially increase the scope of business."

George Marrs, superintendent of the Tampa plant, will be in charge of operations in Fort Pierce. Superior will retain the field work specialists, Clyde H. Norton, R. H. Howell and W. R. Briggs, with Wallace Long, entomologist and horticulturist in charge of this department.

PASTURE OPERATORS will benefit from the complete IMPROVED PASTURES PROGRAM which has been started. Superior's Pasture Specialist, Leroy Fortner, will spend considerable time working with the field staff and pasture operators.

Grove operators will benefit from the COMPLETE line of Superior's EXTRA VALUE BRAND Insecticides, now available at Fort Peirce.

Superior is extremely happy to be able to better service the east coast, and extends a cordial invitation to all growers and pasture operators to use the free field services and to purchase the high quality EXTRA VALUE BRANDS fertilizers and insecticides.

With this announcement, all the folks at Superior WISH YOU A VERY MERRY CHRISTMAS AND A HAPPY NEW YEAR!

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R. M. Pratt

Citrus Insect Control

R. B. Johnson

For December 1954

W. L. THOMPSON,
R. M. PRATT
R. B. JOHNSON*
Florida Citrus Experiment Station, Lake Alfred

W. L. Thompson

Red scale infestations have reached a peak at an average level of 3.1 percent, compared with 1.5 percent in November of the last two years and 4.5 percent in 1951. Since red scale infestations tend to be spotty, the amount of injury is higher than is apparent from the over-all average. The level of activity can be expected to decline slowly during December.

Purple scale activity has also reached a peak and the average infestation is higher than it usually is in the fall months. The level of infestation is expected to remain fairly high through December.

Purple mite activity increased to a moderate level during November. The distribution of infestations over the state has been less uniform than it usually is, with activity high in the more southern districts and unusually low in the Gainesville, Orlando, and Upper East Coast Districts. Activity will probably be moderately high in December, and even a low population may cause considerable leaf drop at this time.

Rust mite activity was high in November, but not as high as in the last two years. There will probably be some increase in infestation on leaves during December, but activity on the fruit is not expected to increase.

Spray Program

December is a difficult time to decide what to do about scale insects. Whether to spray now or to wait is not an easy question to answer. In general, however, it can be said that groves heavily infested with either purple or red scale will need treatment soon, while it may be possible to delay spraying where infestations are only light to moderate.

There is no question that heavy infestations of scale insects should be controlled during December. Trees carrying a heavy load of scale are weakened and are very susceptible to cold injury. Too much scale may mean too much leaf drop followed by an excess of dead wood and, almost certainly, a severe and costly fruit drop even if freezing weather does not occur.

Whether to spray for light to moderate scale infestations is a more difficult question. During cool weather the life cycle of scale insects is somewhat longer than during the warmer months. Increases in populations are thus slower to develop. There is also always the likelihood that a high natural mortality may occur during December and January. These considerations indicate that it would be advisable to delay spraying for light to moderate scale infestations, but the possibility of fruit drop should not be overlooked. It is advisable to examine the stem end of fruit for the presence of scale insects wherever fruit drop is excessive. Although other factors may cause abnormal fruit drop, the presence of scale insects about the stem is a good indication that scales are responsible. Control measures are recommended wherever purple scale is the cause of dropped fruit.

Purple mites have been causing mezophyll collapse and increasing the severity of firing and leaf drop in many groves for several weeks. Such damage can be expected to continue where these mites are not controlled. To control mites satisfactorily at this time of year, sprays must be thoroughly applied before heavy populations have built up. This means that careful examinations of trees, especially tree tops and green twigs, should be made as frequently as possible and sprays applied as soon as purple mites are easy to find. Care should be taken to thoroughly spray tree tops and inside leaves, particularly on trees with dense foliage. The best of miticides are ineffective where trees are not properly sprayed. In checking for mites, unhatched eggs should be noted because a high egg population may be a warning of a high future mite population.

Rust mites, like purple mites, are capable of causing leaf drop. For this reason, as well as to prevent discoloration of fruit, rust mites should be kept at a low level. Rust mites are frequently most numerous in the tops of trees and are more common on leaves than on fruit during the cool winter months.

Scale Control: Parathion is the preferred scalicide for December use because oil sprays give more of a shock to the trees. Oils applied in December increase the susceptibility of trees to cold injury and may reduce the crop the following year: Parathion should be used at 1 2/3 pounds per 100 gallons of spray.

A new scalicide, malathion, may be used where it is not desirable to use parathion, such as around dwellings or within city limits. Malathion may be used at 3 to 5 pounds of 25 percent material per 100 gallons for light to moderate infestations of either purple or red scale, but it has not been very effective against heavy infestations.

Purple Mite Control: DN Dry Mix at 2/3 pound per 100 gallons of spray will give good control of purple mites if applied thoroughly and before mites become numerous. Aramite at 2 pounds or ovex at 1 pound per 100 gallons may be used instead of DN Dry Mix. Any of these miticides may be combined with parathion for joint scale and mite control. Although sprays are more effective than dusts, a 1.5% DN-sulfur dust may be used instead of a spray, but even more important than with a spray, thorough coverage is essential for good control.

Rust Mite Control: The best spray for control of rust mites during cool weather is a combination of 1 gallon of lime-sulfur plus 5 to 8 pounds of wettable sulfur. Lime-sulfur, however, cannot be combined with DN Dry Mix or aramite. Where either of these miticides are to be used, omit lime-sulfur and increase the wettable sulfur to 10 pounds per 100 gallons.

For more detailed information, refer to the "Better Fruit Program" for 1954 or consult the Citrus Experiment Station at Lake Alfred, or Fort Pierce.

*Written November 26, 1954. Reports of surveys by Harold Holtsberg, Cocoa; J. W. Davis, Tavares; K. G. Townsend, Tampa; R. B. Weeks, Avon Park; and T. H. Hallam, Lake Alfred.

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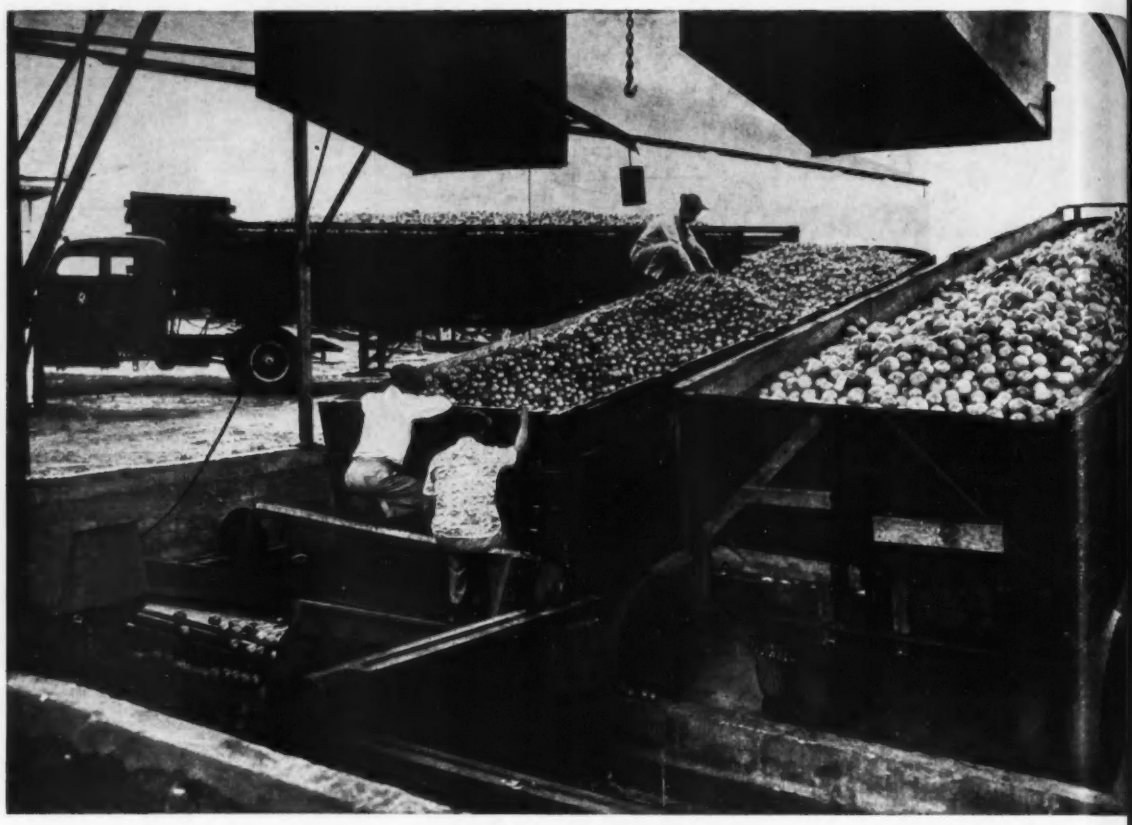

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Cause And Nature Of Spreading Decline Of Citrus

(Concluded From Last Issue)

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AT MEETING FLORIDA STATE HORTICULTURAL SOCIETY

In another test, 12 plants were grown in fumigated soil and the roots of six of them were infested with 200 adult burrowing nematodes picked out under the microscope. Three months later the test plants were stunted and the rootlets were extensively deteriorated, whereas the check plants were making good growth and showed no symptoms of Decline. An examination of the soil and rootlets showed that burrowing nematodes were present in the soil and within the roots of the test plants only. Not only were they present, but their numbers had increased materially and larval stages were found in abundance. This demonstrated that the burrowing nematode is able to reproduce within citrus roots. No other plant parasitic nematodes were present in the roots of these plants.

At this point, it should be mentioned that during the early stages of the work, the disease could not be reproduced under controlled conditions in pots either in the greenhouse or in the open, using either soil from affected groves or soil inoculated with affected roots. This greatly hampered the progress of the work until it was found that the focus of the disease appeared to be below a 20-inch depth and that below this depth feeder roots were formed but disintegrated within a week, leaving the bare laterals. This led to experiments in which the temperature of the soil was controlled at about 75 F., in which case there was a rapid decline of plants growing in subsoil from affected areas. This led to the building of large tanks in which pots of soil could be maintained between 75 F. and 78 F. and under these conditions it was easy to produce the decline using soil from decline areas. This was one of the really big advances in the course of the research and these tanks are now serving for the screening of rootstocks and chemical treatments as well as for direct work on the nematode, itself. The three original tanks each contained 108 cans, each can was connected to a drainage system, and now a new and larger type is under construction.

Burrowing Nematodes

The burrowing nematode was first found and described by Cobb in 1890 on the roots of bananas in Fiji Islands (3). Subsequently it was found attacking many other plants in widely seperated countries. A discussion of the known distribution and host range of this nematode is given by Brooks (1). The burrowing nematode is now known as Radopholus similis (Cobb) Thorne 1949 and its past synonymy is as follows: **Tylenchus similis** Cobb 1893, Tylenchus acutocaudatus Zimmermann 1898, **Tylenchus biformis** Cobb 1919, Anguillulina similis (Cobb 1893) Goodey 1932, and Rotylenchus similis (Cobb 1893) Filipjev 1936.

The burrowing nematode is a small plant parasitic worm about 1/50 of an inch long. It requires a source of living plant tissue for its food supply and feeds on the tender cortex tissues of rootlets, forming burrows and cavities. The females deposit eggs inside the rootlets where the young are hatched. The young

feed on the rootlets until the available food supply is exhausted and then leave the deteriorated rootlet in search of sound roots suitable for food. The burrowing nematode spends most of its life within rootlets and is therefore classified as endoparasitic in contract to parasitic nematodes that live outside the root in the soil and classified as ectoparasitic. When it leaves the deteriorated rootlet and moves about in the soil, it is in a migratory phase. The duration of the migratory period depends on the length of time required to find and enter another healthy rootlet. It is in this migratory stage that the nematodes, traveling in all directions in search of roots, extend the area of infestation and thus account for the "creeping" nature of Spreading Decline. The actual distance that an individual burrowing nematode may travel in the soil has not been determined, but it is probably not very far. Burrowing nematodes have been found invading citrus rootlets 12 feet deep. They have been found in soil and roots of trees two or three rows in advance of the visible disease margin. From the known average annual rate of spread of the disease and the lateral spread of these nematodes beyond the visible disease area, it becomes apparent that trees are infested one to two years before showing symptoms of decline.

Method Difficult

The lack of an efficient method for easily extracting burrowing nematodes from samples was one of the main reasons why it was so difficult to find the parasite the first time and to study the disease. Root dissection under a microscope, though a reliable method for finding the nematodes, is slow, tedious and not adapted to intensive research on the nature of the disease, control studies and extensive survey work. Before studies of this nature could be intensified, a satisfactory method had to be devised to seperate easily and positively burrowing nematodes from sample material. Methods commonly used for the isolation of other plant parasitic nematodes were not satisfactory in these studies and it was often necessary to sample repeatedly a suspected area or even known infested areas in order to find burrowing nematodes. This failure to extract the nematodes from samples in which they were present interfered with the progress of investigation. A much simpler method was devised in cooperation with Dr. H. W. Young of the Sub-Tropical Experiment Station, who was investigating the burrowing nematode on avocados. The root sample is carefully washed and stored for a few days in a closed pint jar. At the end of this incubation period, the roots are washed with about 2 teaspoons of water to remove the nematodes that have crawled out of the rootlets, and this wash water containing the nematodes is examined under the microscope. This technique assures the investigator of finding burrowing nematodes if they are present in the sample. Not only is the method easy to use, but it is highly efficient for processing a large number of samples with certainty; it thus expedites the survey and research work on Spreading Decline.

The dissemination of Spreading Decline becomes understandable when the knowledge that it is caused by the burrowing nematode becomes available. Infested nursery stock used for setting out new groves or for replants in previously non-infested groves accounts for establishment of new centers of infection. Some of our common ornamental plants are hosts of the burrowing nematode and this explains why so often Spreading Decline has started adjacent to homesites and buildings in and about groves. There is still no evidence to date that machinery is a factor in the transmission of burrowing nematodes, but infested roots could conceivably become entangled in machinery and subsequently be deposited in new locations, where, if conditions were favorable, the nematode could become established. Therefore machinery used for working soil should be cleaned of all plants parts as a precautionary measure before moving such equipment from Decline groves.

OTHER NEMATODES

In the process of this research, nine other species of plant parasitic nematodes not hitherto reported on citrus in Florida have been found associated with citrus roots. In addition to the citrus nematodes which is well known, the sting nematode was found by both the Station workers and Dr. Christie and the nematode which had been previously reported from Florida by Dr. Steiner was found repeatedly in the course of this work. Of the nine parasitic nematodes found, three had been reported associated with citrus roots in other regions and six had never been reported associated with citrus. Although all of these have been found occasionally in areas of Spreading Decline, none of them is either common to or confined to areas of Spreading Decline. Outside of the citrus nematode and the burrowing nematode, the type and extent of damage that may be caused by these nematodes has not been established either here or elsewhere and some of them may do little or no damage and others may be important and produce other types of decline. Investigations along this line are being pursued as rapidly as time and facilities permit. Pertinent information concerning these nematodes in relation to citrus and their occurrance in Florida citrus groves is given here to familiarize the growers with this phase of the research in progress.

Citrus Nematodes

The citrus nematode, Tylenchulus semi-penetrans, Cobb, was reported on citrus roots in Florida by Byars in 1921 (2). This nematode is able to cause a non-thrifty condition of trees in severely infested groves but it does not cause the spreading type of decline. Thus far, the citrus nematode has been found in only 13 groves affected by Spreading Decline, in 2 groves affected by some other type of decline and Suit and Knorr (14) reported finding it in 12 out of 13 apparently healthy groves investigated.

Sting Nematode

The sting nematode, **Belonolaimus gracilis Steiner,** was reported as causing possible damage to citrus in Florida by V. G. Perry and J. H. Christie and a report on its relationship to Spreading Decline was made by Suit and DuCharme (12). In our investigations, the sting nematode has been found in only 16 of 147 groves affected by Spreading Decline, in 14 groves affected by some other type of decline, and in 4 apparently healthy groves. It should be pointed out, with this nematode and other nematodes reported below, that relatively few healthy groves were being investigated for these particular nematodes, so the small numbers reported in this category are not significant. In one experiment, 200 hand-picked adult stin nematodes were placed about the roots of sour orange seedlings grown in soil free of all plant parasitic nematodes. In all cases, sting nematodes became established and attacked the roots of the citrus test plants. In one case, 17 nematodes were sufficient to establish an infestation around the roots of a test plant. Symptoms of Decline were manifested by these test plants within 9 months. Nevertheless, this study demonstrated that sting nematodes are able to reproduce and maintain high populations when only citrus roots are available as a food supply

Meadow Nematode

The meadow nematode, Partylenchus pratensis (de Man) Filipjev, has been reported on citrus in Brazil (4), California (15) and Florida (11). In the course of the investigations on Spreading Decline, it has been found in 21 of 147 affected groves, in 13 groves affected by some other type of decline, and in 7 apparently healthy groves. The meadow nematode resembles the burrowing nematode but does not cause Spreading Decline. Studies made in relation to citrus demonstrate that the meadow nematode penetrates the roots of citrus, makes cavities and reproduces there. Further investigation is being carried on to determine the exact importance of this root parasite to citrus.

Spear Nematode

The spear nematode **Hoplolaimus coronatus** Cobb, was reported associated with roots of citrus in Florida in 1953 (11). So far, this nematode has been found in 54 citrus groves; 36 with Spreading Decline, 13 with some other type of decline and 3 healthy groves. Efforts to infest citrus roots with H. coronatus have not been successful, indicating that this nematode may not reproduce in citrus roots and that it probably is not of importance to citrus.

Aphelenchus avenae Bastian, has been found on citrus roots in Florida (11) and in Rhodesia (7). It has been found in 108 citrus groves in Florida; 68 with Spreading Decline, 33 with some other form of decline and in 4 healthy groves. This nematode is generally found only in association with rotting citrus rootlets. It is probably not a factor in Spreading Decline and probably is not important to citrus since it appears to be feeding on decaying tissues and fungi.

Several other plant parasitic nematodes have been found associated with citrus roots in Florida. Trichodorus sp. Cobb, Hemicycliophora sp. de Man, **Criconemoides citri** Steiner and **Xiphenema americanum** Cobb have been reported already (11). In addition to these, Rotylenchus sp. Filipjev, Hexatylus sp. Goodey, and Aphelenchoides sp. Fischer, are here reported for the first time in association with citrus feeder roots. None of these nematodes appears to be a factor in Spreading Decline and some of them are very rarely found on citrus roots. Further study of these nematodes is being continued.

Characteristics

In the preceding discussion, I have attempted to describe for you the principal characteristics of Spreading Decline and indicated how it differs form other types of decline in having a constantly advancing border. We have also reviewed the comprehensive research that led to the discovery that the burrowing nematode is the primary cause of Spreading Decline **and have outlined the steps involved,** the most important of which were as follows:

1. The burrowing nematode was always found in the Decline areas and was not present in healthy areas, whereas a number of other parasitic nematodes were found occasionally in Spreading Decline areas and also in other areas where no Spreading Decline existed.

2. The symptoms of Spreading Decline have been reproduced under controlled conditions both by using infested soil and by inoculating healthy soil with burrowing nematodes whereas inoculation with other nematodes and with various fungi did not produce the typical symptoms of the decline.

3. Burrowing nematodes were always recovered from the roots of the inoculated plants and had increased greatly in numbers.

4. Evidence has also been produced to show that the burrowing nematode lives and reproduces within the feeder roots of citrus.

We consider the evidence is sufficient to justify the conclusion that the burrowing nematode, Radopholus similis (Cobb) Thorne, is the primary cause of Spreading Decline as described in this discussion.

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Host Range of The Burrowing Nematode Internationally And In Florida

In our investigations of the burrowing nematode, **Radopholus similis** (Cobb) Thorne 1949(a) in relation to the Spreading Decline of citrus, one important factor to consider is the susceptibility of other plants to the nematode. Such information would be of value in explaining the initiation of Spreading Decline in citrus groves, and especially those adjacent to home sites. If native plants are susceptible, it would also have some bearing on the spread of the nematode from grove to grove. The efficiency of any type of control for Spreading Decline in a

citrus grove would be affected if susceptible plants were present in adjacent areas.

The burrowing nematode occurs in tropical and subtropical regions of the world. It was first observed by Cobb (1) in 1890 as a parasite of banana roots in the Fiji Islands. Since that time this nematode has been found in Fiji, Jamica, the Hawaiian Islands, the Philippine Islands, Formosa, South India, Dutch East Indies, Java, Brazil, Central America, and Louisiana, U. .S. A.

R. similis has been reported as infesting the roots of the following plants:

Pineapple **Ananas sativus. Schult.** (3, 5, 6, 7).
Sugar cane, **Saccharum officinarum** L. (2, 3, 5, 6, 7, 8).
Tea, **Thea sinensis** L. (3, 5, 6, 7).
Coffee, **Coffea arabica** L., **C. canephora, C. excelsa** Cheval., **C. quillou, C. robusta** L., **Coffea** sp., (3, 5, 6 7).
Banana, **Musa sapientum** L. (3, 5, 6, 7).
Bamboo, **Gigantochloa apus** Kurz., **Schizostachyum** sp. (3, 5, 7).
Nutgrass, **Cyperus rotundus** L. (3, 5, 6, 7).
Edible canna, **Canna edulis** L. (3, 5, 6, 7).
(a) Synonyms:
Tylenchus similis Cobb, 1893.
Tylenchus acutocaudatus Zimmermann, 1898.
Tylenchus biformis Cobb, 1919.
Anguillulina similis (Cobb, 1893) Goodey, 1932.
Rotylenchus similis (Cobb, 1893) Filipjev, 1936.
Pigeon pea, **Cajanus indicus** Spreng. (3, 5, 6, 7).
Sweet potato, **Ipomoea batatas** Poir. (3, 5, 6, 7).
Abaca, **Musa textilis** Nee. (12).
Black pepper, **Piper nigrum** L. (3, 5).
Cubebs, **Piper cubeba** L. (3, 5).
Cowpea, **Vigna hosei** Backer (3, 5, 7).
Beggarweed, Sticktights, **Meibomia (Desmodium) gyroides** (3, 5).
Bird of paradise, **Strelitzia** sp. (9).
Flamingo flower, **Anthurium andraeanum** Lind. (9).
Calopegonium mucunoides Desv. (3, 5, 7).
Indigofera endecaphylla Jacq. (3, 5, 7).
Tephuesia Candida D. C. (3, 5, 7).
Bradburya (Centrosema pubescens Benth. (3, 5).
Bradburya sp. (5).

The presence of the burrowing nematode on citrus in Florida has been established within the past two years. Definite proof that **Radopholus similis** causes the Spreading Decline

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AT MEETING FLORIDA STATE HORTICULTURAL SOCIETY

of citrus was reported in 1953 (10). In addition the nematode was found to attack avocado roots (4). Dr. J. R. Christie* found **R. similis** on the roots of a poted Philodendron plant sent to him from Miami. This plant had originally been imported from Brazil.

In view of the seriousness of Spreading Decline to citrus it is important that all of the plants which may be hosts of **R. similis** be discovered. In our host-range work at the Station, we, at first, limited our studies to the common weeds and cover crops that are present in the groves (11). Beginning June 1, 1954, we extended our investigations to include ornamentals and other plants, especially the tropical and subtropical species.

In the investigation to determine susceptible plants, two methods of detection are used: Root incubation and root dissection. When **R. similis** is obtained by root incubation, root dissection is then made. In root dissection, if adults and all larval stages of **R. similis** are found in lesions on the roots, such plants are considered definite host plants because this constitutes evidence that the life cycle is completed within the root.

Specimens of plants were obtained from infested grove areas, adjacent to such areas, and nurseries. Plant Board Inspectors have been most helpful in the collection of plants, and particularly Mr. Charles Poucher, the nursery inspector. Mr. Poucher collected suspected plants in suspicious nursery areas for us. This greatly expedited our work.

To date a total of 89 kinds of plants have been examined. Those plants where the root lesions were present and from which **R. similis** was dissected are considered as definite hosts of the burrowing nematode. In some cases the nematode was obtained by the root incubation technique, but was not dissected from the roots. Such plants are considered as possible hosts and additional investigation will be needed for definite proof as to their susceptibility.

In addition to citrus and avocado, the plants which have been found to be hosts of **R. similis** in Florida are:

Banana, **Musa sapientum** L.
Pothos, **Pothos aureus** Lind.
Night blooming jasmine, **Cestrum nocturnum** L.
Bird pepper, **Capsicum furtescens** L.
French mulberry, **Callicarpa americana** L.
Ginger lily, **Hedychium coronatum** Korenig.
Philodendron, **Philodendron** sp.
Cocculus sp.
Snow bush, **Phyllanthus nivosus** Bull., Var. **roseo-pictus** Hort.
Dry flower, **Commelina** sp.
Acanthus sp.
Allamanda, **Allamanda williamsii, A nerifolia** Hook.
Cardinal guard, **Jacobinea** sp.
Ixora, **Ixora coccinea** L.
Bomboo, (Genus undetermined)
Star apple, **Chrysophyllum caninito** L.

With exception of banana, bamboo and Philodendron, this is the first report of infestation of the above plants by burrowing nematode.

Plants considered as possible hosts of **R. similis** based on incubation tests only are:

Magnolia grandiflora L.
Flame vine, **Pyrostegia venusta** Baill.
Yellow jasmine, **Jasminum primulinum** Hemsl.
Eugenia hookeriana.
Anise, **Illicium anisatum** L.
Jasminum pubescens Willd.
Jacaranda sp.
Common crab grass, **Digitaria sanguinalis** (L.) Scop.

In the course of our research relative to Spreading Decline of citrus we have observed that in many cases the apparent point of origin was adjacent to a house or an abandoned home site. This led to the theory that other plants might be hosts of

(Continued on page 14)

Foreign Plant Quarantines

ED L. AYERS
PLANT COMMISSIONER,
STATE PLANT BOARD OF FLORIDA

During the early years of our Nation, the science of horticulture, as we know it, simply did not exist. There was no urge to make two trees grow where one had grown before, and food was no great problem. The world population had not reached the astronomical figures of today, and there was ever virgin territory to the west to be had for the taming. Also, transportation in that era was both limited and slow.

Our progenitors were dependent upon a limited number of sailing vessels for their pasage from Europe and for the transportation of their supplies. Later on in their great trek to the West, they were dependent upon the prairie schooner for the transportation of themselves and their supplies.

Space was always at a premium, and there was little room for the transportation of plants, other than as seed. Most of you have read the story of Johnnie Appleseed who, in his travels through the countryside, gave apple seed to the settlers, thereby earning the title of public benefactor.

Few Insects In Seeds

In those days, when plants were transported principally as seed, there was little movement of insects and diseases into this country from across the seas, and their spread within the country was mainly due to their own habits and natural ability to move about rather than to dissemination by man.

As the country was settled, and population increased, the steam engine was invented and within a few years its application to our railroads and ships brought a great increase both in the amount and speed of our transportation. With the increase in volume and type of transportation facilities, there began an ever-increasing traffic in plants and plant products, not only from the Old World to the New but to all parts of our own country. Movements of live plants and vegetative parts carried with them insects and diseases which often did great damage in new areas where there were no parasites to pray on them and where often native varieties of plants were not resistant to them.

Insects From Foreign Countries

During the early years of the nineteenth century many insects and diseases were brought to this country from all parts of the world. The United States was the last of the great nations of the world to institute plant-quarantine controls, and consequently has been called a paradise for plant pests. These foreign invaders made serious inroads on our agricultural industries, and in some instances wiped out the growing of certain crops.

Fof instance, the growing of chestnuts in this country has been wiped out by chestnut blight, which kills the trees. About 1910, farmers and growers realized that something must be done, and as a result the Federal Plant Quarantine Act of 1912 was placed in effect. Most of the States soon followed suit, and passed laws governing the transportation and sale of plants and plant products within their borders.

Florida's first effective law of this type was passed in 1915. This law was known as the Florida Plant Act, creating the State Plant Board, and was very similar to the law under which the Board now operates. At the time of the passage of the Plant Act, the citrus industry of Florida was threatened with destruction by citrus canker, a plant disease invader from Japan. Officials of the State Plant Board, after about fourteen years of strenuous and diligent work, succeeded in eradicating the disease, and no infections have been found since 1927.

Later on in the history of horticulture in Florida, two extremely destructive insects--Mediterranean defly and citrus blackfly--were eradicated. The eradication of citrus canker and Mediterranean fruit fly, both invaders from foreign countries, are regarded throughout the world as outstanding examples in the field of plant pest control.

Today Florida, with its billion dollar citrus industry, is one of the few fruit-producing areas of the world where citrus canker and various destructive fruit flies are not found. The citrus canker which invaded Florida was of a type that could not be satisfactorily controlled and, had it not been eradicated, would have arrested the development of and eventually destroyed our citrus industry.

The other citrus-producing areas of the United States are likewise free of serious fruit flies, and we are able to market pure citrus juice in canned and frozen form, free from the contamination of worm juice.

Plant Quarantine

When the Federal Plant Quarantine Act was first put into effect in 1912, there was still a rather limited movement of plants and plant products, and Federal inspectors were able to check to some extent the influx of foreign plant pests and diseases not found in the United States. State authorities were also successful in preventing the spread of many pests which were already established.

Both State and Federal officials had fresh in their minds the destruction that some of the foreign invaders had caused. As the years have gone by, however, the volume and speed of travel and transportation have increased beyound the most extravagant dreams of our ancestors.

As can well be realized, the automobile, truck, bus, and particularly the airplane have revolutionized travel and transportation of all sorts of commodities. With the huge increase in travel and transportation, many problems have developed, and with them an ever-increasing need for a more diligent and intelligent inspection and certification of all plant material that is transported from one area to another, either foreign or domestic.

Effects of International Trade

The great surge of international

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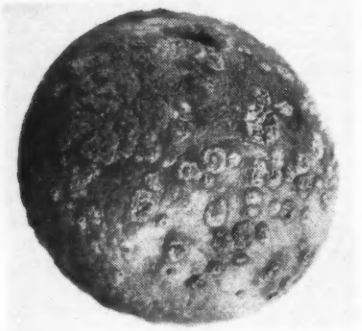
trade, the wide travel of millions of people, and false economy have in recent years gradually broken down the effectiveness of our foreign plant quarantine.

Customs and Department of Agriculture officials have in some instances been inadequate in number to do a satisfactory job of inspection, and in many other instances they have succumbed to increased pressure



Citrus Canker On Grapefruit

from international travelers, transportation agencies, brokers, and foreign governments, and have made every effort to admit all plant material offered for entry even when, as appears to many of us, the entry of this material would represent a hazard to our own agricultural interests. In other words, they have appeared to lean backward to help pressure interests instead of leaning backward to protect our growers.

In the last quarter of 1949, the Treasury Department engaged in making a test of the effectiveness and value of foreign baggage examination by instituting at Boston, New York, and Miami a system of spot examination of incoming baggage. "Spot examination" meant the careful inspection of approximately 10 percent of the baggage. To complete the test, the remaining 90 percent of the baggage was also inspected as a check. It was conclusively shown that had only one bag in any particular lot been examined, only 9.6 percent of the plant material would have been intercepted and that the remaining 90.4 percent would have been spread to all parts of the country.

After the testing of four different systems of baggage examination, it was recommended by the reviewing committee that because of the danger of introduction into the country of agricultural pests and animal diseases, with resultant devastation and costs, as well as the illegal introduction of narcotics and other prohibited articles, the proposal that "the complete inspection of passengers and their baggage be discontinued and a spot check be instituted" be rejected.

Revise Inspection

Even though the tests made in 1949 had proven to be a failure, in April 1953 Customs districts were instructed to revise the present system of examination of arriving baggage for a six-month period, such change in procedure to become effective in May 1953.

Accordingly, by June 1 all Florida ports had instituted a modified baggage examination, which was a decided departure from the policy we had long depended upon to assist in stopping the entry of imported insect pests and plant diseases at the ports. Early in June, previous instructions were supplemented by instructions to the Inspectors of Customs and others concerned with respect to processing of passengers and their baggage, which strengthened the procedure somewhat.

The six-month trial period test of baggage examination inaugurated in May 1953 is still in effect, and today the percentage of incoming baggage examination in Florida depends upon the origin of the passenger. It will vary from one piece of baggage to one hundred percent. No amount of effort has sufficed to bring about a restoration of the original method which involved approximately one hundred percent examination of all foreign baggage.

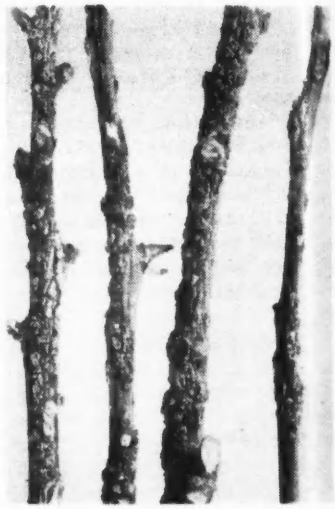
The Customs Service insists that there are not sufficient men available to make a more complete inspection. In many instances this is true, especially at the larger ports. However, they now appear to predicate their inspection on the examination of one parcel for each traveler from some countries, and let it go at that. .

At a recent meeting of the National Plant Board, the members of which represent all sections of the United States, which was held here in Miami and was attended by representatives of all of the Federal and State plant quarantine orgnizations, two days were spent in discussing recently introduced insects known to be destructive to plants and plant products, such as the European rose chafer, the golden nematode, and the khapar beetle. The khapra beetle has recently been found in several of the Western States. It is an enemy of stored grain, for which there is no known satisfactory method of control. In a very short time it turns the valuable contents of warehouses into worthless dust.

Efforts to Rescend Quarantine

Of great concern to Florida are some experiments now being carried on by the United States Department of Agriculture, the State Department, and certain individuals not fully identified, with the purpose of rescinding the present quarantine against mandarin oranges from Japan. I have no doubt that the bacteria causing citrus canker can be killed when on the surface of the skin, but you cannot convince me that there is any treatment that will destroy the bacteria which are deeply embedded in the corky scabs that are formed by this disease.

Our investigations indicated that there is no area in Japan which is



Citrus Canker On Round Orange Twigs

free from this disease, but that in certain "export" groves cheap labor is constantly picking and destroying infected leaves and fruit.

Experiments made by both Federal Government and Florida scientists have shown that the bacteria are capable of persisting over long periods of time on boxes and in soil under favorable conditions. Canker lesions are not nearly as numerous and pronounced on the mandarin oranges as on the round orange and grapefruit, but lesions are formed on both the leaves and the fruit, which are just as capable of carrying the disease as would be the case with the more seriously attacked round orange and grapefruit.

It is proposed to bring this fruit into our Northwestern States, where citrus is not grown, but an occasional box of this fruit finds its way into this State from Canada and the chances of receiving it from our North-

western States would be multiplied many times. Certainly, the small amount of economic gain from the shipment of a limited number of mandarins to the Northwestern States would not offset the danger to the huge citrus industries of Florida, California, Arizona, and Texas—a two billion dollar citrus industry taken as a whole.

Cooperation

The various States, cooperating with the Federal Government, are in many instances doing a much better job in controlling insects and plant diseases than has been done in excluding them. The Japanese beetle, pink bollworm, golden nematode, white-fringed beetle, gypsy moth, Hall scale, and other introduced insects have, through stringent quarantine measures, been restricted to limited areas and, with exception of the pink bollworm, have spread very slowly.

However, our first line of defense should be stressed: plant quarantine inspection at the ports of entry. Additional work on our borders and more realistic entrance requirements would, in our opinion, pay off and be much more economic in the long run.

It may appear that the list of insects and diseases now present in this country includes them all, but this is not the case. There are still many dangerous pests in foreign countries which we do not have here and which, if they should be introduced and become established, could bring great havoc to our agriculture and horticulture.

There are now knocking at the doors of California and Texas the Mexican fruit fly and the citrus blackfly, either of which would be a very serious pest if introduced into a citrus-producing area. There are present in many foreign coutries the Mediterranean fruit fly, the Oriental fruit fly, and other insects that many of you know are not only a threat to our citrus industry but also to certain other fruits such as avocados and mangoes.

The State plant quarantine officials, although discouraged, have not yet given up their fight to secure better baggage inspection and a better interpretation and enforcement of Federal Quarantine No. 37, with its many regulations, on the subject of the entry of nursery stock and other plants. We feel that our agriculture should not be jeopardized in favor of travelers, hobbyists, and small foreign interests. The greatness of Florida and America depends on their agriculture.

I appreciate the efforts you have made in the past in connection with all of the problems that have faced your State Plant Board, and I sincerly hope that, with your help, something can be accomplished toward the tightening of our foreign quarantines which will make them more effective and our agricultural interests more secure.

Paper presented at meeting of State Horticultural Society, Miami Beach, Florida, October 21, 1954.

MISS ANNA HEIST AWARDED RECOGNITION CERTIFICATE

Miss Anna E. Heist, former home demonstration agent in St. Johns County, Florida, was awarded a certificate of recognition by Epsilon Sigma Phi at its annual convention recently. Epsilon Sigma Phi is an organization of veteran Agricultural Extension Service workers throughout the country.

Miss Heist was agent in St. Johns for 35 years before retiring in 1953. She had received the distinguished service award of the National Home Demonstration Agents' Association and other honors.

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Quality Factors In Frozen Florida Orange Concentrate

ARTHUR R. POBJECKY
MRG. CONC. DIV. SOUTHERN FRUIT DISTRIBUTORS, ORLANDO, FLA.

AT MEETING FLORIDA STATE HORTICULTURAL SOCIETY

Members and friends of the Florida State Horticulture Society: since your society is comprised of experts and technical men versed in every phase of growing and processing of citrus products, I will direct my discussion to the consumers of our "Cinderella Product" Frozen Orange Concentrate.

Dear Consumer, whenever we overproduce and our markets show signs of weakness, we delight in telling the world that the quality of our products is to blame. Being modest, we never tell you that the Flordia Citrus industry has done more to improve the quality of its products than any other I know of. Were you ever told that Florida is the only state in the Union that has a law to protect the consumer of its citrus products. This law, known as the Florida Citrus Code, is policed by a staff of some five hundred Federal State Inspectors. It guarantees every user of Florida Frozen Orange Concentrate the following. A glass of orange juice extracted from sound mature oranges; that it is **pure orange juice** without sugar or any other additives; that it contains fruit solids equivelent or exceeding that of the original fruit used; that it is neither excessively acid nor excessively bland; that it does not contain excessive peel oil and other defects; that it is packed under sanitary conditions from wholesome fruit, and that it is an acceptable product in both color and flavor.

This law does not protect you against possible deteriation or even spoilage due to improper handling and storage. Frozen Orange concentrate must be handled like any other perishable frozen product; actually it requires even colder temperatures due to its high fruit solids. Too many consumers take advantage of quantity sales that do not have adequate freezer storage for their purchases. Small wonder that the product thaws and loses much of its freshness and bouquet, or in extreme cases becomes totally unfit for use.

Phenomenal Growth

However, my topic of discussion deals with those variations in quality that exist in Orange Concentrate under normal conditions. The phenomenal growth of the Frozen Concentrate industry proves my point that Florida has produced, as a whole, a very satisfactory product. I will not try to prove that our product does not vary in quality. To produce this years record pack of sixty five million gallons of concentrate we utilize fifty million boxes of Oranges. Were these Oranges uniform in color and flavor? Of course not! These oranges varied in quality mainly because they were not of one variety; they varied in quality to a lesser degree because they were grown in various groves with different types of soil; they grew under different climatic conditions; they had different fertilizers and spray applications; they were grown on young and old groves; they were harvested over a period of seven months; and even the oranges off the same tree varied in quality depending on the amount of sunlight the individual orange was exposed to.

You consumers are entitled to know that we grow three different crops of oranges in Florida, all of which contain an abundance of vitamin C and other health giving properties. However, these varieties do have distinct variations in color and flavor. Our early varieties of oranges harvested in October and November produce an orange juice rich in vitamin C, pale yellow in color, and bland in flavor. Our mid-season oranges harvested during December through February produces a juice with a more desirable yellow orange color, and more distinct orange flavor. Our late variety, Valencia Oranges, are harvested during March through June and give us our finest Frozen Orange Concentrate. The juice of these oranges with its deep orange color and rich orange flavor can not be excelled.

Early Packs

Our early packs of Frozen Orange Concentrate were made entirely from Valencia oranges as our industry grew we utilized our mid-season Oranges, and now of course some concentrates includes at least a percentage of the early varieties. I hope that this explains much of the variations you find in our product; normal variations found in the fruit we use. However, here, again I am proud of the many steps the industry has taken to minimize these differences. Blending of Oranges to give you the very best product possible has become an exacting science. If you extract orange juice at home, at the best, you will have the blend of probably a dozen oranges, whereas the can of frozen orange concentrate you purchase will contain a blend of juices taken from tends of thousands of oranges. Oranges that have been tested prior to picking so that the processor can mix these in such proportions as to give you the most uniformed product possible. Not satisfied with blending various fruit at time it is harvested the industry has even gone a step further for the sake of uniformity. Some processors rather than give the consumer a product that varies in color and flavor depending on variety of oranges in season; concentrate the orange juice, keep it frozen in bulk containers, and at a later date add this back to blend with another variety. In this manner narrowing the range in color and flavor found between the early fruit and our Balencia Orange.

Effect on Pack

To a lesser degree methods of pro-

cessing also effect the quality of frozen orange concentrate. Since some of our consumers are not familiar with the methods of manufacturing, I will give a short story on this first. Oranges are harvested and brought to the concentrate plant. Federal State Inspectors draw samples from each load of oranges and test for sugar solids, acidity and juice content. Each load of oranges is stored in an individual bin and tagged with the information furnished by the Fresh Fruit Inspectors. The processor then blends fruit from various bins to keep a uniform ratio of fruit solids to acidity. This blend of oranges is conveyed through various washers and germicidal sprays to make the outside of the orange as clean and free of bacteria as possible. The fruit passes over a grading table and all damage oranges are elimated. Sound fruit moves into mechanical extractors that removes the orange juice. The orange juice passes through finishers which remove any seeds or large particles of pulp, and finished juice is pumped into a cold storage tank from which it is fed into evaporators. These evaporators are kept under such high vacuum that the orange juice actually boils at a lower temperature than that of the outside air. This is part of the secret of the fresh flavor of this product. However, much of the flavor and bouquet of the orange juice is also evaporated with the water. Consequently the orange juice is concentrated above the point of the final product. this allowing for the addition of some thirty percent fresh orange juice to the Concentrated portion. This addition of juice, which has not been subject to evaporation, restores the fresh orange flavor and aroma to the finished product.

Federal inspectors are stationed in the plant to test the finished product. If it complies with all the requirements of the Florida Citrus Code the processor is allowed to can the finished product. Usually the con centrate is brought down to a tem perature just above freezing point by means of cold wall blending tanks and votators. After the cans are filled and sealed they pass through a freezer tunnel where blasts of subzero air freeze the product. It is then cased, and stored at subzero temperature. This entire operation is mechanical and human hands only touch that fruit which is elimated at the grading tables. The entire operation is continuous. Tree ripened fruit harvested in the morning is converted into frozen orange concentrate ready for consumption within hours of the time it leaves the groves.

The minor variations in quality because of processing are due to these points; the actual selection of available fruit; the degree of sanitation maintained in the plant; the yield of orange juice—that is the processor may over extract the oranges and obtain some of the bitter flavors from the peel, seeds and pulpy portion of the orange; the temperature that the evaporators are operated at—that is to increase production he may operate at slightly higher temperatures thus increasing evaporation; the degree to which the orange juice is concentrated—the higher concentration allowing for a larger porportion of fresh juice to be added to the finished product; the speed at which the product is frozen; and of course the storage temperature and care of handling to the time the product is consumed.

Controversial Point

There is one point that I will touch upon, and this one is so controversial that I have saved it for the last. The concentrate you purchase is of such strength that you add three parts of water to one part concentrate. This returns to the product the exact amount of water that was evaporated giving you a drink of pure undiluted orange juice. This ratio of three to one was chosen for several reasons. Three parts of water are ample to thaw the one part of frozen concentrate and by the same token the frozen concentrate chills the reconstituted juice to proper drinking temperature. Secondly, this allows the processor to concentrate the juice to approximately fifty five percent fruit solids and then reduce to forty two percent with the addition of one third fresh orange juice. However, after this concentrate was adopted and made part of the Florida Citrus Law it was discovered that the product at this concentration if abused in storage had the optimium portions of fruit sugars, acid and pectin to cause jellation. Once the product jelled no amount of stiring or agitation would make it reconstitute back properly with the addition of water. All of the vast number, of technical men associated with the industry were put to work on this problem. The outcome of this research was this: that by flash heating that portion of the orange juice that went to the evaporators to a temperature of approximately 160 Fahrenheit sufficient enzymes were inactivated to greatly reduce gellation in the finished product. The controversy is whether this application of heat impairs the fresh flavor of the finished product. It is my feeling that too much of an issue has already been made on this subject. Too many of the arguments have been based on the individuals approach to the problem rather than on the actual facts, consequently exaggerated claims have been made on both sides of the issue.

In conclusion; it has been my lot to taste TEST samples of orange concentrate from all segments of the industry since its conception, and I can still say that as a whole all of Florida Frozen Orange Concentrate is a very satisfactory product! Differences in quality are mainly due to the difference in the varieties of fruit we use; to a lesser degree to the differences in our actual production procedures. Our entire industry is to be commended for a job well done. The miracle of bringing our wonderful Florida Sunshine into your home through every can of frozen orange concentrate we produce.

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NOTES OF THE TRADE

SUPERIOR FERTILIZER COMPANY PURCHASES GROWERS FERTILIZER COMPANY, FORT PIERCE

G. D. Sloan, general manager of Superior Fertilizer and Chemical Company, Tampa, has announced the outright purchase of the Growers Fertilizer Company, of Fort Pierce. The purchase was effective November first of this year.

The purchase of the 22 year old Growers company from J. E. Nobles, Jr. former president, will double the potential output of Superior's fertilizers and will give Superior an East Coast plant and office.

G. D. Sloan issued a statement from his Tampa office which said "Superior will make every effort to maintain the fine business Growers has established through its 22 years of operation. In addition, Superior's East Coast customers will be served from this more convenient location. Because of our ability to give much more efficient service and deliveries, we hope to substantially increase the scope of business."

There will be two changes in the operating personnel: George Marrs, superintendent of the Tampa Plant will be in charge of the Fort Pierce plant and office. Wallace Long, entomologist and horticulturist, will be in charge of the field work. In addition to these men, J. Leroy Fortner, Superior's pasture specialist, will be working with the field men and pasture operators at the East Coast plant

Superior's operations will include an intensive program for pasture operators as well as increasing the services to the citrus industry.

Another addition to the Fort Pierce branch will be the including of the complete line of Superior's insecticides. These insecticides should find ready acceptance from Growers' customers as they have from Superior's customers.

FIFIELD IS SOUTHERN EXPERIMENT STATION SECTIONAL CHAIRMAN

Director Willard M. Fifield of the University of Florida Agricultural Experiment Stations was named Southern regional chairman of the Experiment Station Section of the Association of Land Grant Colleges and Universities at the group's recent meeting in Washington.

Dr. C. C. Murray, dean and director of agriculture at the University of Georgia, was named chairman of the entire Experiment Station Section.

For the past year Mr. Fifield has been chairman of the committee of nine experiment directors who review regional research projects conducted by two or more experiment stations, in cooperation with the U. S. Department of Agriculture.

ALYCE CLOVER HAY CROP AND PASTURES REDUCED BY LACK OF MOISTURE

Hernando County's crop of Alyce clover hay this season is shorter than usual and its pastures are not in as good condition at this time as in past years because of drought in late summer and early fall, says County Agent Harry J. Brinkley.

Lack of moisture also reduced yields of eggplant and prevented citrus from sizing up as well as it should. Cool weather during the past few weeks has improved quality and color of citrus, however.

HOST RANGE OF THE BURROWING NEMATODE INTERNATIONAL AND IN FLODIDA

(Continued from page 8)

the burrowing nematode and thus initiate an infestation in the grove.

One important aspect in our host range studies that bears thought is the fact that some of the susceptible plants do not show recognizable symptoms of decline. Such plants are dangerous in that they harbor the burrowing nematode without showing visible symptoms. These plants could be transported and planted in or adjacent to a nursery or grove, thereby establishing a new infestation. It is anticipated that nursery inspection practices now being considered by the State Plant Board will be of much value in preventing new nematode infestation in the future.

In general, tropical and subtropical plants are more likely to be susceptible. Those plants that have succulent roots appear to be favored by this nematode. The investigation of other possible hosts of the burrowing nematode, **R. similis,** has been in progress only a comparatively short time. In view of the number of plant species found to be infested by R.

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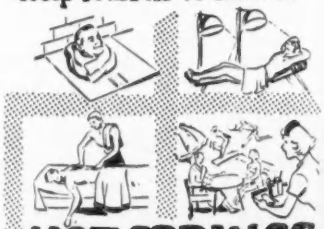

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similis thus far, it is likely that more will be found.

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USDA Purchases Canned Grapefruit Sections For School Lunches

The U. S. Department of Agriculture has announced the purchase of 251,200 cases of 24 No. 2 cans of U. S. Fancy grade grapefruit sections at an average price of $3.35 per case, f. o. b. shipping points. Purchases were made under Section 6 of the National School Lunch Act of 1946.

These canned grapefruit sections, all from Florida processors, will be delivered during the period December 20 through February 12 to schools participating in the National School Lunch Program.

The Department also announced its intention to purchase an additional quantity of canned sections, under purchase specification mailed to grapefruit canners on Nov. 12.

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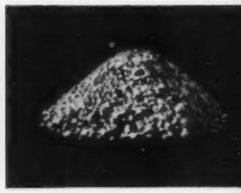

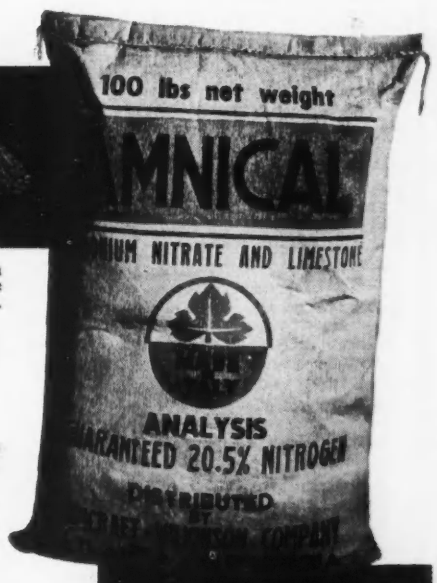

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AMNICAL'S nitrogen is in approximately one-half nitrate form making it quick-acting and immediately available to growing crops.

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The LYONIZER

COMPILED BY THE LYONS FERTILIZER COMPANY

Reports Of Our Field Men . . .

HIGHLANDS AND POLK
J. K. Enzor, Jr. & R. E. Lassiter, Jr.

Most growers by the 15th of November had completed their fall fertilizer application. It can be said that generally most growers fertilized earlier this year than a year ago.

Most of the Ridge area at the time of this writing has received a fair amount of rainfall for the month of November. Although some few spots had begun to get dry.

We are noticing mid-season fruit drop in quite a few groves at this time. In some scattered blocks it looks as though it might become serious.

Some growers have taken considerable damage from purple mites in this area. However, several blocks have been observed losing leaves from what was apparently purple mites, but upon close examination no adult mites, eggs, or cast shins could be found on the remaining leaves or twigs. Evidently the dry winds experienced the latter part of October and into the early part of November caused this leaf drop. We want to emphaize that we are not minimizing potential damage from purple mites. This is again an example of the situation where growers should thoroughly inspect their groves when considering sprays or dust.

There is a very general and strong feeling throughout this section of the industry that the present USDA fruit estimate for 1954-55 season is far in excess of the fruit that is actually here. In talking with many growers and buyers on crops that have already been picked, we have yet to find one that picked out as well as last year.

Needless to say growers should continue to check groves for all citrus pests.

NORTH CENTRAL FLORIDA
V. E. Bourland

Weather has been dry but we have had rain off and on since Thursday, and finally have had a good season of rain which has been very helpful to all groves, and it seems that you can already see a difference in the sizing up of oranges, however the general run of fruit can stand quite a bit more sizing. Since the rain stopped most all are picking again, still quite amount of fruit won't pass test. Prices are still low, oranges 85 cents to $1.00 on the tree. Through the dry weather most all groves have had scale, also red and purple mite, which has kept the growers on the job checking and controlling.

Not as much acreage in this section being planted in vegetables as previous years. Dry weather and frost have put a brown color on most all pastures, and cattle shows it.

NORTH HILLSBOROUGH AND PINELLAS COUNTIES
J. A. Hoffman

Rains and cool weather during the last of October and first of November have helped fruit to color and mature faster. Fruit seems to be of higher quality this year than usual, but might turn up a little short of crop estimate from the lack of inside fruit on trees.

Most growers have applied their fall application of fertilizer plus an application of Limestone to condition the soil for best growing results. A close watch for purple mite and rust mite should be maintained.

SOUTH POLK, HIGHLANDS, HARDEE AND DESOTO COUNTIES
C. R. Wingfield

Rains during mid November brought relief to the groves in this section: Many were about ready to line out irrigation pipes when it came. At the present the moisture is very good and will aid the fertilizer application being applied. Generally the groves are in good condition and holding their color well.

Cool weather has done much to color our fruit and we hope it will be well received in the markets. The Hamlin movements appear to be increasing daily and the buyers are looking towards the beginning of the Pineapple orange deal. It still looks as if we have a large Early and Mid-season crop but from all reports to date the trees have not picked out as expected due to lack of inside fruit and small sizes.

During the dry period prior to November 14th. there has been lots of spraying done and to those growers who will spray soon I would advise a close check for Red Spider for they are very active in some sections. And your Miticide can and should go in with your sulphur spray.

While the cirtus grower was glad to see the rains the vegetable grower (especially the man with tomatoes ready to pick) was not happy.

EAST HILLSBOROUGH AND PASCO COUNTIES
E. A. McCartney

We finally got the rain we were hoping for over part of my section especially Hillsborough County. Groves were starting to wilt in some sections. We are now in the middle of the fall application of fertilizer at the rain came at a very good time.

The price on early oranges has been up since the last report, grapefruit is light as previously reported and prices are fair. Good sizes and clean fruit should do better. The discouraging news mentioned in last months Lyonzier was 60 to 70 per box on early oranges on the tree. This has changed now for the better and hope there will be further improvement in the next two weeks which is the time this reaches the readers.

SOUTHWEST FLORIDA
Eaves Allison

Early and mid season oranges are really taking on a fine color now in this area. This is due in part to the unusually cool weather of early November. Also at this time—Nov. 15—we have had a good general rain of over three inches which should give sufficient moisture for some time to come. Eating quality of early citrus, both oranges and grapefruit, is steadily improving.

Gladiola crops in this territory vary from good to fair—with market prospects good. Quite a few growers have discontinued operations over this section, and this should ease the pressure of oversupply this season.

Naturally that good Lyons Fertilizer is keeping all the good crops green and growing!

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Uncle Bill Says:

Like as always for the past two or three decades most of us citrus growers kin find some troubles with our business . . . like too many pests and insects or too little money for the fruit we raise, or like seasons when grapefruit seem not to have too much appeal, or fruit bein' too small, or there bein' too much water or not enough, or maybe the weather gits too cold . . . but in spite of all these things they ain't no business we know of that on an average pays a better dividend on the investment than the business of citrus raisin' . . . at least, that's the way it looks in our book.

And speakin' of troubles seems like we ain't the only ones that has wŏrries . . . seems that the United States Senate has some little difficulties that makes citrus troubles look sort of little by comparison . . . and we reckon that if we looked hard enough we'd find some individuals whose got troubles that would sort of make our own seem sort of trivial.

So all in all we'd recommend . . . particularly at this season of the year . . . that we count our blessings, 'specially taking into consideration our bettered condition as compared with a few years ago . . . and never failing to count those who have shown us their friendship, while good health, peace of mind and a heap of other blessin's that most of us can be right proud of havin'.

Seems like the Florida grower is pretty well off . . . 'specially when he sees that his trees and crops is given the proper nourishment . . . 'n that ain't hard to provide if we use Lyons Fertilizers, fer as they have said fer so many years Lyons Fertilizers Produce Maximum Crops of Finest Quality . . . 'n so fer as our own experience is concerned this slogan is mighty well founded.

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Collins Asked To Proclaim . . . "Eat More Florida Citrus Week"

Citing the immense growth of the Florida citrus industry in the last decade and its importance to the general economy of the state, Sen. LeRoy Collins, who will become governor on Jan. 4, will be asked to officially proclaim the week of Jan. 15-22, as "Eat More Florida Citrus Week."

Jack M. Berry, president of the Florida Citrus Exposition, which will be held during that period, said Governor-Elect Collins will be requested to make this proclamation one of his first official acts after assuming office.

"Right here in Florida we have a tremendous potential market, largely untapped, for our citrus products and if we can encourage our own citizens to use more oranges, grapefruit and tangerines in fresh and processed form, we could aid in the prosperity of our state and the citrus industry in particular," Berry declared.

The governor's proclamation, to be requested by the FCE, "is not merely to give added publicty and prestige to the Exposition, but will be designed to call the attention of all Floridians to the health and nutritive values of our own fruit, and to get them to tell their northern friends about it," the show chief added.

In line with the Exposition's general purpose to encourage the production and merchandising of top quality fruit, all the new grove care and harvesting equipment, developed and refined during the past year, will be on display during the run of the Exposition, with a new layout on the Exposition esplanade designed to make room for more exhibitors, Phil E. Lucey, FCE general manager, said.

Also on the quality theme will be an expanded "Fresh Fruit Contest" which will offer ribbons, trophies and cash awards to growers exhibiting premium fruit. Florida Citrus Mutual in addition to sponsoring "Fresh Fruit Day" on Jan. 20, will have charge of this contest.

STATE OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946, OF THE CITRUS INDUSTRY, PUBLISHED MONTHLY AT BARTOW, FLORIDA, FOR OCTOBER, 1953.

STATE OF FLORIDA,
COUNTY OF POLK.

Before me, a notary public in and for the State and County aforesaid, personally appeared S. L. Frisbie, who having been duly sworn according to law, deposes and says that he is the Editor of The Citrus Industry and that the following is to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March, 1922, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher — Associated Publications Corp., Bartow, Fla.

Editor — S. L. Frisbie, Bartow, Fla.

2. That the owners are:

Associated Publications Corporation, Bartow, Florida.

S. L. Frisbie, Bartow, Fla .
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F. L. Skelly, Orlando, Fla.
B. W. Skinner, Dunedin, Fla.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholders or security holders appears upon the books of the company as trustee or in any other fiducary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold than that of a bona fide owner.

S. LLOYD FRISBIE
Manager

Sworn to and subscribed before me this 29th day of September, 1954.

RHEA L. SUTTON, Notary Public
My commission expires Jan. 21, 1956.

No dog is very enthusiastic about a hunt which he has not been in.—Dr. Clarence Poe.

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Florida growers now consider magnesium a primary plant food in the same category with nitrogen, phosphorus and potash.

The recommendations of the Florida Citrus Experiment Station at Lake Alfred, published in January 1954, stress the need for large application of magnesium for Citrus in soluble form and state that it is usually applied as a Sulphate.

Ask your fertilizer manufacturer for EMJEO, long a dependable source of this key plant food.

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USDA Proposes Regulations For Certification Of Pesticides

The U. S. Department of Agriculture has proposed regulations to be followed in obtaining USDA certification of usefulness of pesticide chemicals as now authorized by the 1954 amendment to the Federal Food, Drug and Cosmetic Act.

Under this amendment to the Act (Public Law 518 — the so-called Miller Bill) residue tolerances or exemptions may be established for pesticide chemicals likely to occur as residues on harvsted food crops, so that human consumption of toxic amounts of these chemicals can be avoided.

The amendment requires that a tolerance be established by:

1. Filing a petition proposing the tolerance, together with supporting scientific data to establish safe residue levels, with the Secretary of Health, Education, and Welfare (Administrator of the Food, Drug and Cosmetic Act.)

2. Filing with the Secretary of Agriculture a copy of the petition and a request to certify to the Secretary, HEW, that the pesticide chemical is useful for its intended purpose and that the requested tolerance reasonably reflects the amount of residue, if any, likely to result when the pesticide is used as proposed.

The complete proposals for certification procedure are being published by USDA in the Federal Register and include these points:

a. Requests for certification (see 2 above) should be made in writing to the Chief, Plant Pest Control Branch, Agricultural Research Service, USDA, Washington 25, D. C. Certification should be asked for, only on economic poisons that have been registered or submitted to USDA for registration as pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act. These requests must be accompanied by a copy of the petition for tolerance that has been submitted to the Secretary, HEW (see 1 above.)

b. Requests for certification should be supported by reports of all experimental work demonstrating the effectiveness and usefulness of the pesticide. These data, plus any other valuable information about the pesticide, serve as a basis for USDA's certification decision.

c. If for any reason certification is not justified in all respects, the applicant will be so informed by registered mail. Within a week after receipt of notification, the applicant can file a request with the Chief, Plant Pest Control Branch, for (1)) certification to the extent proposed by USDA; (2) a hearing on the proposed certification of the parts objected to; (3) both such certification and a hearing; or (4) withdrawal of the request for certification.

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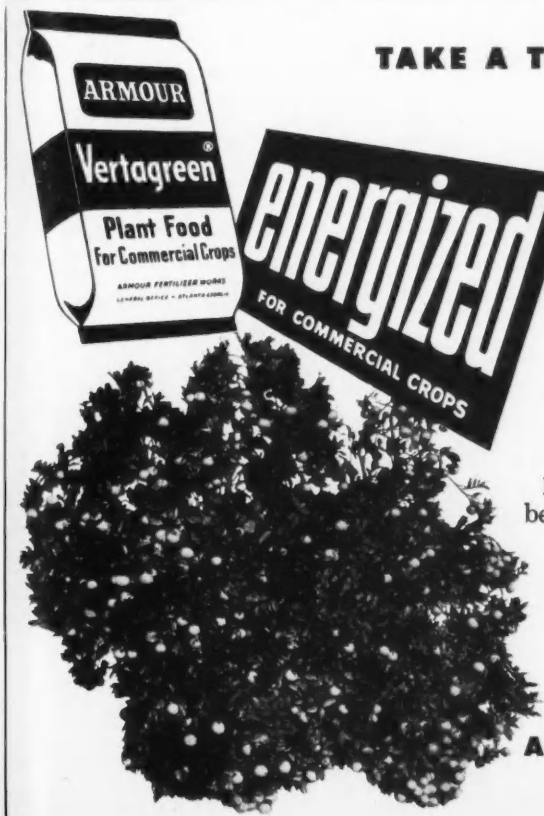

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